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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,252	02/07/2006	Masayuki Kimura	P27944	1417

7055 7590 01/27/2009

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EXAMINER	
HA, JULIE	

ART UNIT	PAPER NUMBER
1654	

NOTIFICATION DATE	DELIVERY MODE
01/27/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/537,252	KIMURA ET AL.	
	Examiner	Art Unit	
	JULIE HA	1654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 October 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12 and 25-38* is/are pending in the application.

4a) Of the above claim(s) *1-12 and 34-37* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *25-33 and 38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/22/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Amendment to non-final rejection filed on October 8, 2008 is acknowledged. Claims 13-24 have been cancelled. Claims 1-12 and 25-38 are pending in this application. Applicant elected with traverse of Group II (claims 25-33 and 38) and elected species whole blood as the type of leukocyte-containing liquid and polyvinyl chloride as the type for flexible resin in the reply filed on April 21, 2008. Applicant's traversal was not found persuasive, and the restriction requirement was deemed proper and made FINAL in the previous office action. Claims 1-12 and 34-37 remain withdrawn from further consideration as being drawn to nonelected inventions. Claims 25-33 and 38 are examined on the merits in this office action.

This application contains claims 1-12 and 34-37 drawn to an invention nonelected with traverse in the reply filed on April 21, 2008. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Withdrawn Objections and Rejection

1. Objection to the abstract is hereby withdrawn in view of Applicant's amendment to the abstract.

2. Objection to claims 28, 33 and 38 are hereby withdrawn in view of Applicant's amendment to the claims.

3. Rejection of claim 32 under 35 U.S.C. 112, second paragraph as having insufficient antecedent basis is hereby withdrawn in view of Applicant's amendment to the claim.

Maintained Rejection

35 U.S.C. 112, 1st

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 25-33 and 38 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The MPEP states that the purpose of the written description requirement is to ensure that the inventor had possession, as of the filing date of the application, of the specific subject matter later claimed by him. The courts have stated:

"To fulfill the written description requirement, a patent specification must describe an invention and do so in sufficient detail that one skilled in the art can clearly conclude that "the inventor invented the claimed invention." Lockwood v. American Airlines, Inc., 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (1997); *In re Gosteli*, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989) (" [T]he description must clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed."). Thus, an applicant complies with the written description requirement "by describing the invention, with all its claimed limitations, not that which makes it obvious," and by using "such descriptive means as words, structures, figures, diagrams, formulas, etc., that set forth the claimed invention." Lockwood, 107 F.3d at 1572, 41 USPQ2d at 1966." Regents of the University of California v. Eli Lilly & Co., 43 USPQ2d 1398.

The MPEP lists factors that can be used to determine if sufficient evidence of possession has been furnished in the disclosure of the Application. These include "level of skill and knowledge in the art, partial structure, physical and/or chemical properties, functional characteristics alone or coupled with a known or disclosed correlation between structure and function, and the method of making the claimed invention. Disclosure of any combination of such identifying characteristics that distinguish the claimed invention from other materials and would lead one of skill in the art to the conclusion that the applicant was in possession of the claimed species is sufficient." MPEP 2163.

Further, for a broad generic claim, the specification must provide adequate written description to identify the genus of the claim. In Regents of the University of California v. Eli Lilly & Co., the court stated:

> "A written description of an invention involving a chemical genus, like a description of a chemical species, 'requires a precise definition, such as by structure, formula, [or] chemical name,' of the claimed subject matter sufficient to distinguish it from other materials. Fiers, 984 F.2d at 1171, 25 USPQ2d at 1606; *In re Smythe*, 480 F.2d 1376, 1383, 178 USPQ 279, 284-85 (CCPA 1973) ("In other cases, particularly but not necessarily, chemical cases, where there is unpredictability in performance of certain species or subcombinations other than those specifically enumerated, one skilled in the art may be found not to have been placed in possession of a genus. . . ."). Regents of the University of California v. Eli Lilly & Co., 43 USPQ2d 1398.

The MPEP further states that if a biomolecule is described only by a functional characteristic, without any disclosed correlation between function and structure of the sequence, it is "not sufficient characteristic for written description purposes, even when accompanied by a method of obtaining the claimed sequence." MPEP 2163. The MPEP does state that for generic claim the genus can be adequately described if the disclosure presents a sufficient number of representative species that encompass the

genus. MPEP 2163. If the genus has a substantial variance, the disclosure must describe a sufficient variety of species to reflect the variation within that genus. See MPEP 2163. Although the MPEP does not define what constitute a sufficient number of representative, the Courts have indicated what do not constitute a representative number species to adequately describe a broad generic. In Gostelli, the Court determined that the disclosure of two chemical compounds within a subgenus did not describe that subgenus. *In re Gostelli*, 872 F.2d at 1012, 10 USPQ2d at 1618.

In the instant case, the claims are drawn to a leukocyte removal filter comprising: nonwoven fabric having an average fiber diameter of 0.3 to 3.0 μm and a formation index y of 50 or less corresponding to a thickness of 0.3 mm. The generic statement nonwoven fabric having a formation index y of 50 or less corresponding to a thickness of 0.3 mm does not provide ample written description for the leukocyte removal filter since the specification does not show that the applicant was in possession of the claimed invention at the time of filing of the application. The specification does not clearly provide examples of leukocyte removal filter having a formation index of 50 or less corresponding to a thickness of 0.3 mm of the claimed invention.

The specification is limited to the leukocyte removal filter having an average fiber diameter of 0.3 and 3.0 μm and a formation index y of 50 or less corresponding to the thickness 0.23 and 0.22. The working examples describe the nonwoven fabric formed of PET having a thickness o 0.23 mm, a filling rate of 0.14, an average fiber diameter of 1.3 μm, and a formation index of 38.0 (see Example 1). Example 2 describes a nonwoven fabric formed of PET and having a thickness of 0.23 mm, a filling rate of

0.14, an average fiber diameter of 1.3 μm, and a formation index of 40.9 (see Example 2). Example 3 describes a nonwoven fabric formed on PET and having a thickness of 0.23 mm, a filling rate of 0.14, an average fiber diameter of 1.3 μm, and a formation index of 47.5 (see Example 3). Example 4 describes a nonwoven fabric formed on PET, having a thickness of 0.22 mm, a filling rate of 0.14, an average fiber diameter of 1.6 μm, and a formation index of 48.5. These examples were compared with comparative examples. Comparative example 1 describes a nonwoven fabric formed on PET, having a thickness of 0.24 mm, a filling rate of 0.14, an average fiber diameter of 1.2 μm, and a formation index of 55.5; comparative example 2 describes a nonwoven fabric formed on PET, having a thickness of 0.24 mm, a filling rate of 0.13, an average fiber diameter of 1.3 μm, and a formation index of 61.3; comparative example 3 describes a nonwoven fabric formed on PET, having a thickness of 0.24 mm, a filling rate of 0.13, an average fiber diameter of 1.3 μm, and a formation index of 65.0; comparative example 4 describes a nonwoven fabric formed on PET, having a thickness of 0.23 mm, a filling rate of 0.13, an average fiber diameter of 0.9 μm, and a formation index of 62.6 (see Comparative Examples 1-4 and Table 1). Example 5 describes 25 sheets of PET nonwoven fabric having a thickness of 0.23 mm, a filling rate of 0.14, an average fiber diameter of 1.3 μm, and a formation index of 38 (see Example 5). Example 6 describes 25 sheets of PET nonwoven fabric having a thickness of 0.23 mm, a filling rate of 0.14, an average fiber diameter of 1.3 μm, and a formation index of 40.9 (see Example 6). Example 7 describes 25 sheets of PET nonwoven fabric having a thickness of 0.23 mm, a filling rate of 0.14, an average fiber diameter of 1.3 μm, and a formation index of 47.5

(see Example 7). Example 8 describes 25 sheets of PET nonwoven fabric having a thickness of 0.22 mm, a filling rate of 0.14, an average fiber diameter of 1.6 μm, and a formation index of 48.5 (see Example 8). These examples were compared with comparative examples. Comparative example 5 describes using 25 sheets of PET nonwoven fabric having a thickness of 0.24 mm, a filling rate of 0.14, an average fiber diameter of 1.2 μm, and a formation index of 55.5; comparative example 6 describes using 25 sheets of PET nonwoven fabric having a thickness of 0.24 mm, a filling rate of 0.13, an average fiber diameter of 1.3 μm, and a formation index of 61.3; comparative example 7 describes using 25 sheets of PET nonwoven fabric having a thickness of 0.24 mm, a filling rate of 0.13, an average fiber diameter of 1.3 μm, and a formation index of 65.0; comparative example describes using 25 sheets of PET nonwoven fabric having a thickness of 0.23 mm, a filling rate of 0.13, an average fiber diameter of 0.9 μm, and a formation index of 62.6 (see Comparative Examples 5-8 and Table 2). The specification does not describe any leukocyte removal filter having nonwoven fabric having an average fiber diameter of 0.3 to 3.0 μm and a formation index y of 50 or less corresponding to a thickness of 0.3 mm. Descriptions of nonwoven fabric having a thickness of 0.23 or 0.22 or 0.24 and formation index of 38 (thickness 0.23) to 65 (thickness 0.24) are not sufficient to encompass the claimed invention of a leukocyte removal filter comprising nonwoven fabric having a formation index y of 50 or less corresponding to a thickness of 0.3 mm. There are no descriptions of nonwoven fabrics having a formation index y of 50 or less corresponding to a thickness of 0.3 mm. The examples provided in the instant specification are directed to nonwoven fabrics having a

thickness of 0.23, 0.22, and 0.24 mm. Additionally, the comparative examples provided in the instant specification are directed to nonwoven fabrics having a thickness of 0.24 and 0.23, and having formation indexes of greater than 50 (55.5, 61.3, 65, and 62.6, see Table 1).

The description requirement of the patent statute requires a description of an invention, not an indication of a result that one might achieve if one made that invention. See *In re Wilder*, 736 F.2d 1516, 1521, 222 USPQ 369, 372-73 (Fed. Cir. 1984) (affirming rejection because the specification does "little more than outlin[e] goals appellants hope the claimed invention achieves and the problems the invention will hopefully ameliorate"). Accordingly, it is deemed that the specification fails to provide adequate written description for the genus of the claims and does not reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the entire scope of the claimed invention.

6. Claims 25-33 and 38 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for nonwoven fabric having an average fiber diameter 0.3 to 3.0 mm and a formation index y of 50 or less corresponding to a thickness of 0.23 and 0.22 mm, does not reasonably provide enablement for all formation index y of 50 or less corresponding to a thickness of 0.24, 0.23 mm, and 0.3 mm. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

The factors to be considered in determining whether a disclosure meets the enablement requirement of 35 U.S.C. 112, first paragraph, have been described in *In re Wands*, 8 USPQ2d 1400 (Fed. Cir. 1988). Among these factors are: (1) the nature or the invention; (2) the state of the prior art; (3) the relative skill of those in the art; (4) the predictability or unpredictability of the art; (5) the breadth of the claims; (6) the amount of direction or guidance presented; (7) the presence or absence of working examples; and (8) the quantity of experimentation necessary. When the above factors are weighed, it is the examiner's position that one skilled in the art could not practice the invention without undue experimentation.

(1) The nature of the invention:

The invention is drawn to a leukocyte removal filter to obtain a leukocyte-free liquid from blood product for blood transfusion (such as whole blood product, red cell product, platelet product or plasma product, or an intermediate for preparing the blood product).

(2) The state of the prior art:

The prior art teaches leukocyte removal filters having different diameters and different thickness for removing leukocytes and other agents from blood products. Tanaka et al (US Patent No. 6,048,464) teach a leukocyte-removing filter material having a fiber structure composed of a plurality of fibers having an average fiber diameter of not less than 0.01 μm but less than 1.0 μm (see abstract). The reference

further teaches that the thickness of the leukocyte-removing filter material is between 0.1 mm to 30 mm, preferably 0.1 mm to 15 mm (see column 7, lines 44-59). Example 1 of the reference teaches a nonwoven fabric having a thickness of 0.2 mm, a bulk density of 0.2 g/cm^3, a basis weight of 40 g/m^2 and the average fiber diameter is 1.2 mm prepared by a melt-blown method and coated with a copolymer (see column 16, lines 17-32).

Lee et al (US Patent No. 5,817,237) teach filter devices for simultaneously removing leukocytes and viral inactivating agents from whole blood or blood fractions (see abstract and Figure 1). The reference teaches that the filters are typically non-woven mats of controlled fiber diameter and thickness (see column 2, lines 17-20). The reference teaches that the blood or blood fraction is passed through a layer containing activated carbon and at least on shape-sustaining laid textile web having a thickness of 1 to 8 mm (see column 3, lines 10-14).

The art provide different leukocyte removing filters having different diameters and different thicknesses.

(3) The relative skill of those in the art:

The relative skill of those in the art is high.

(4) The predictability or unpredictability of the art:

The instant claim recites that a formation index y of 50 or less corresponds to a thickness of 0.3 mm. However, as indicated by Tables 1 and 2 of the instant

specification, nonwoven fabrics having a thickness of 0.24 mm and 0.23 mm had higher formation index than 50 (for example, 55.5, 61.3, 65.0 and 62.6 from Table 1). Therefore, not all leukocyte removal filters comprising nonwoven fabric having a thickness of 0.3 mm would give a formation index y of 50 or less. Therefore, there is unpredictability in the art.

(5) The breadth of the claims:

The claims are drawn to a leukocyte removal filter comprising nonwoven fabric having an average fiber diameter of 0.3 to 3.0 μm and a formation index y of 50 or less corresponding to a thickness of 0.3 mm.

(6) The amount of direction or guidance presented and (7) The presence or absence of working examples:

The instant specification describes nonwoven fabric formed of PET having a weight per square meter of 40 g/m2, a thickness of 0.23 mm, a filling rate of 0.14, and average fiber diameter of 1.3 μm, and a formation index of 38.0 (see Example 1). Example 2 describes a nonwoven fabric formed of PET and having a thickness of 0.23 mm, a filling rate of 0.14, an average fiber diameter of 1.3 μm, and a formation index of 40.9 (see Example 2). Example 3 describes a nonwoven fabric formed on PET and having a thickness of 0.23 mm, a filling rate of 0.14, an average fiber diameter of 1.3 μm, and a formation index of 47.5 (see Example 3). Example 4 describes a nonwoven fabric formed on PET, having a thickness of 0.22 mm, a filling rate of 0.14, an average

fiber diameter of 1.6 μm, and a formation index of 48.5. These examples were compared with comparative examples. Comparative example 1 describes a nonwoven fabric formed on PET, having a thickness of 0.24 mm, a filling rate of 0.14, an average fiber diameter of 1.2 μm, and a formation index of 55.5; comparative example 2 describes a nonwoven fabric formed on PET, having a thickness of 0.24 mm, a filling rate of 0.13, an average fiber diameter of 1.3 μm, and a formation index of 61.3; comparative example 3 describes a nonwoven fabric formed on PET, having a thickness of 0.24 mm, a filling rate of 0.13, an average fiber diameter of 1.3 μm, and a formation index of 65.0; comparative example 4 describes a nonwoven fabric formed on PET, having a thickness of 0.23 mm, a filling rate of 0.13, an average fiber diameter of 0.9 μm, and a formation index of 62.6 (see Comparative Examples 1-4 and Table 1). Example 5 describes 25 sheets of PET nonwoven fabric having a thickness of 0.23 mm, a filling rate of 0.14, an average fiber diameter of 1.3 μm, and a formation index of 38 (see Example 5). Example 6 describes 25 sheets of PET nonwoven fabric having a thickness of 0.23 mm, a filling rate of 0.14, an average fiber diameter of 1.3 μm, and a formation index of 40.9 (see Example 6). Example 7 describes 25 sheets of PET nonwoven fabric having a thickness of 0.23 mm, a filling rate of 0.14, an average fiber diameter of 1.3 μm, and a formation index of 47.5 (see Example 7). Example 8 describes 25 sheets of PET nonwoven fabric having a thickness of 0.22 mm, a filling rate of 0.14, an average fiber diameter of 1.6 μm, and a formation index of 48.5 (see Example 8). These examples were compared with comparative examples. Comparative example 5 describes using 25 sheets of PET nonwoven fabric having a thickness of

0.24 mm, a filling rate of 0.14, an average fiber diameter of 1.2 μm, and a formation index of 55.5; comparative example 6 describes using 25 sheets of PET nonwoven fabric having a thickness of 0.24 mm, a filling rate of 0.13, an average fiber diameter of 1.3 μm, and a formation index of 61.3; comparative example 7 describes using 25 sheets of PET nonwoven fabric having a thickness of 0.24 mm, a filling rate of 0.13, an average fiber diameter of 1.3 μm, and a formation index of 65.0; comparative example describes using 25 sheets of PET nonwoven fabric having a thickness of 0.23 mm, a filling rate of 0.13, an average fiber diameter of 0.9 μm, and a formation index of 62.6 (see Comparative Examples 5-8 and Table 2). The specification does not describe any leukocyte removal filter having nonwoven fabric having an average fiber diameter of 0.3 to 3.0 μm and a formation index y of 50 or less corresponding to a thickness of 0.3 mm. Descriptions of nonwoven fabric having a thickness of 0.23 or 0.22 or 0.24 and formation index of 38 (thickness 0.23) to 65 (thickness 0.24) are not sufficient to encompass the claimed invention of a leukocyte removal filter comprising nonwoven fabric having a formation index y of 50 or less corresponding to a thickness of 0.3 mm. There are no descriptions of nonwoven fabrics having a formation index y of 50 or less corresponding to a thickness of 0.3 mm. The examples provided in the instant specification are directed to nonwoven fabrics having a thickness of 0.23, 0.22, and 0.24 mm. Additionally, the comparative examples provided in the instant specification are directed to nonwoven fabrics having a thickness of 0.24 and 0.23, and having formation indexes of greater than 50 (55.5, 61.3, 65, and 62.6, see Table 1).

Although the specification provides guidance on the leukocyte removal filter having a thickness of 0.23 and 0.22 mm, the specification does not disclose a leukocyte removal filter having a thickness of 0.3 mm. Furthermore, the working examples and comparative examples provided indicate that having thicknesses of 0.23, 0.22, 0.24 mm do not correspond to formation index of less than 50. As indicated above, Comparative Example 1, having a thickness of 0.24, average diameter of 0.14 μm had formation index of 55.5. This implies that a leukocyte removal filter comprising a nonwoven fabric having a diameter of 0.3 to 3.0 μm and a thickness of 0.3 mm would not correspond to formation index y of 50 or less. Further, using the equation provided in the instant specification, wherein $y < a \times$ average fiber diameter of nonwoven fabric (μm) + 55, and $a = -4$, comparative example 4 would give $y < (-4) \times (0.9) + 55$ (i.e., y is less than 51.4). Table 1 indicates that the formation index y of comparative example 4 is 62.6.

There is no clear guidance as how to make and use a leukocyte removal filter comprising a nonwoven filter having an average diameter of 0.3 to 3.0 μm and a formation index y of 50 or less, when not all fiber thickness of 0.3 mm correspond to formation index y of 50 or less.

(8) The quantity of experimentation necessary:

Since it is unclear what fiber thickness would correspond to formation index y of 50 or less, one of ordinary skill in the art would be burdened with undue "painstaking experimentation study" to determine if the nonwoven fiber thickness of 0.3 mm correspond to formation index y of 50 or less.

Response to Applicant's Arguments

7. Applicant argues that "the meaning of the phrase 'having a formation index y of 50 or less corresponding to a thickness of 0.3 mm" does not necessarily require having a filter with an actual thickness of 0.3 mm. The formation index at a corresponding value of 0.3 mm thickness has to be understood as a calibrated value, obtained by several measurements with varying filter thickness...'the formation index is significantly affected by the thickness of the nonwoven fabric.'" Applicant argues that "a person of ordinary skill in the art would have understood that the recitation in present claim 25 refers to a calibrated value based on several actual measurements, and that it is not required to use a filter having exactly a thickness of 0.3 mm." Further, Applicant argues that "Equation (2) is not an equation for calculating the formation index y based on the knowledge of the average fiber diameter. Equation (2) is an empirical equation, which requires that the formation index y must be lower than the result of Equation (2)."

8. Applicant's arguments have been fully considered but have not been found persuasive. Claim 25 recites, "…a formation index y of 50 or less corresponding to a thickness of 0.3 mm." This implies that a thickness of 0.3 mm is required to obtain a formation index y of 50 or less. Claim 27 further recites, "...wherein y satisfies the following inequality: $y < -4 \times$ average fiber diameter of nonwoven fabric (μm) = 55." This also implies that the formation index is dependent on the fiber diameter, i.e., it is a result-effective variable. The specification at paragraph [0070] discloses that "after completing the formation index measurement for all three combinations, a linear regression equation of the thickness and the formation index is created, and the

formation index at a thickness of 0.3 mm is calculated using the equation." This also implies that a thickness of 0.3 mm is required to obtain a formation index of 50 or less. However, all of the working examples provided in the specification describe filter thickness of 0.23 (Ex 1), 0.23 (Ex 2), 0.23 (Ex 3), 0.22 (Ex 4), 0.23 (Ex 5), 0.23, (Ex 6), 0.23 (Ex 7) and 0.22 (Ex 8) that have formation index of 38, 40.9, 47.5, 48.5, 38, 40.9, 47.5 and 48.5 respectively. They also all have the same filing rate, and all have average fiber diameter of 1.3 except for Examples 4 and 8 (fiber diameter of 1.6). A person of ordinary skill in the art would not have understood that the recitation in present claim 25 refers to a calibrated value based on several actual measurements, and that it is not required to use a filter having exactly a thickness of 0.3 mm. The claim recites that a leukocyte removal filter is comprised of a nonwoven fabric having an average fiber diameter of 0.3 to 3.0 μm and a formation index y of 50 or less that correspond to a thickness of 0.3 mm. The claim does not indicate that the thickness of 0.3 mm is a calibrated value and that the thickness is less than 0.3 mm. The claim recites that a formation index y of 50 or less is provided by a thickness of 0.3 mm. Descriptions of nonwoven fabric having a thickness of 0.23 or 0.22 or 0.24 and formation index of 38 (thickness 0.23) to 65 (thickness 0.24) are not sufficient to encompass the claimed invention of a leukocyte removal filter comprising nonwoven fabric having a formation index y of 50 or less corresponding to a thickness of 0.3 mm. There are no descriptions of nonwoven fabrics having a formation index y of 50 or less corresponding to a thickness of 0.3 mm. The examples provided in the instant specification are directed to nonwoven fabrics having a thickness of 0.23, 0.22, and 0.24 mm. Furthermore, since it

is unclear what fiber thickness would correspond to formation index y of 50 or less, one of ordinary skill in the art would be burdened with undue "painstaking experimentation study" to determine if the nonwoven fiber thickness of 0.3 mm correspond to formation index y of 50 or less. Therefore, at the time of filing the instant application, application was not in possession of a leukocyte removal filter comprising a nonwoven fabric having a thickness of 0.3 mm that corresponds to a formation index y of 50 or less.

Rejection-35 U.S.C. 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

For the purpose of this invention, the level of ordinary skill in the art is deemed to be at least that level of skill demonstrated by the patents in the relevant art. Joy Technologies Inc. V. Quigg, 14 USPQ2d 1432 (DC DC 1990). One of ordinary skill in the art is held in accountable not only for specific teachings of references, but also for inferences which those skilled in the art may reasonably be expected to draw. *In re Hoeschele*, 160 USPQ 809, 811 (CCPA 1969). In addition, one of ordinary skill in the art is motivated by economics to depart from the prior art to reduce costs consistent with desired product properties. *In re Clinton*, 188 USPQ 365, 367 (CCPA 1976);*In re Thompson*, 192 USPQ 275, 277 (CCPA 1976).

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 25-29, 33 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US Patent No. 6,048,464, filed with IDS).

13. Tanaka et al teach a leukocyte-removing filter material which includes a porous element having fine pores of an average pore diameter of not less than 1.0 μm but less than 100 μm and a fiber structure composed of plurality of fibers having an average fiber diameter of not less than 0.01 μm but less than 1.0 μm (see abstract). This reads on claim 25-28, 33 and 38 in part. The reference teaches that the thickness of the leukocyte-removing filter material is preferably not less than 0.1 mm but less than 30 mm in the direction of the flow (see column 7, lines 44-47); it is more preferable that the thickness of the filter material in the flow direction is not less than 0.1 mm but less than 15 mm (see column 7, lines 57-59). The reference further teaches that the fabric having an average diameter of not less than 1.0 mm but less than 100 mm was obtained by the melt-blowing process (see column 13, lines 55-63, and Example 1). The reference teaches that the filter for removing leukocyte may further contain other filter materials on

the upper stream side and/or the downstream side of the filter material (see column 14, lines33-36). The reference further teaches that the leukocyte-containing solution contains fine aggregates in many cases. In order to remove leukocyte from a leukocyte-containing solution which contains a large amount of such fine aggregates, a prefilter can be used (see column 14, lines 37-40), meeting the limitation of claim 29. The reference teaches that the leukocyte removal filter comprises a feed opening, a filter material, a discharge opening, pouring a leukocyte-containing solution from the feed opening and recovering the solution filter through the filter material from the discharge opening (see column 14, lines 62-67). The reference further teaches that a filtering method has such advantages as excellent leukocyte-removing performance, simple operation, low cost, etc, and this method comprises removing leukocyte by sticking or adsorbing using a nonwoven fabric as a filter material is now the best since this method is particularly excellent in leukocyte-removing performance (see column 1, lines 55-62). Tanaka reference teaches the leukocyte removal filter having a nonwoven fabric made of a polyester having an average fiber diameter of 1.2 μm, the thickness of 0.2 mm, a bulk density of 0.2 g/cm^3 and a basis weight of 40 g/m^2 (see Example 1, column 16, lines 17-19 and lines 29-32). According to the instant specification, a nonwoven fabric having an average diameter of 1.3 and thickness of 0.23 would had a formation index of 38, 40.9 and 47.5; a nonwoven fabric having an average diameter of 1.6 and thickness of 0.22 had a formation index of 48.5 (see Table 1). Thus, a nonwoven fabric having an average diameter of 1.2 μm, thickness of 0.2 mm and a basis weight of 40 g/m^2 would necessarily have formation index of less than 50, and would have a filling rate or 0.05 to

0.30. The reference teaches that the leukocyte containing liquid are whole blood preparation, a concentrated erythrocyte preparation, a platelet concentrate preparation and a body fluid (see column 15, lines 1-5). Furthermore, with respect to “wherein the leukocyte removal filter removes leukocyte from a leukocyte-containing liquid...” according to MPEP 2111.04: "Claim scope is not limited by claim language that suggests or makes optional but does not require steps to be performed, or by claim language that does not limit a claim to a particular structure. However, examples of claim language, although not exhaustive, that may raise a question as to the limiting effect of the language in a claim are:

(A) “adapted to” or “adapted for” clauses;

(B) “wherein” clauses; and

(C) “whereby” clauses.

The determination of whether each of these clauses is a limitation in a claim depends on the specific facts of the case. In *Hoffer v. Microsoft Corp.*, 405 F.3d 1326, 1329, 74 USPQ2d 1481, 1483 (Fed. Cir. 2005), the court held that when a “whereby’ clause states a condition that is material to patentability, it cannot be ignored in order to change the substance of the invention.” Id. However, the court noted (quoting Minton v. Nat’l Ass’n of Securities Dealers, Inc., 336 F.3d 1373, 1381, 67 USPQ2d 1614, 1620 (Fed. Cir. 2003)) that a “whereby clause in a method claim is not given weight when it simply expresses the intended result of a process step positively recited.” Id. <”. In the instant case, it is not deemed that the “wherein” clause limits the claim to particular structural features.

The difference between the reference and the instant claims is that the reference does not teach nonwoven fabric having a thickness of 0.3 mm.

14. However, it would have been obvious to one of ordinary skill in the art to optimize the fabric thickness of the filter. The reference teaches that when the thickness of the fiber is less than 0.1 mm, the frequency of the collision between the filter material and the leukocyte in the leukocyte-containing solution is reduced, and a high-leukocyte-removing performance is difficult to achieve. When the thickness is not less than 30 mm, the resistance of the filter material to the passing of the leukocyte-containing solution therethrough becomes high, and the treatment time is elongated and the erythrocyte membrane is broken to cause hemolysis (see column 7, lines 47-56). Therefore, one of ordinary skill in the art would have been motivated to optimize the filter thickness to achieve the optimal leukocyte filtration rate. The MPEP states the following: Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. *"[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."* In re Aller, *220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)* (Claimed process which was performed at a temperature between 40°C and 80°C and an acid concentration between 25% and 70% was held to be prima facie obvious over a reference process which differed from the claims only in that the reference process was performed at a temperature of 100°C and an acid concentration of 10%.); see also Peterson, 315 F.3d at 1330, 65 USPQ2d at 1382 ("*The*

normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages."); In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969) (Claimed elastomeric polyurethanes which fell within the broad scope of the references were held to be unpatentable thereover because, among other reasons, there was no evidence of the criticality of the claimed ranges of molecular weight or molar proportions.). For more recent cases applying this principle, see Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. Denied, 493 U.S. 975 (1989); *In re Kulling*, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997). There is a reasonable expectation of success, since the Tanaka reference teaches the leukocyte removal filter having a nonwoven fabric made of a polyester having an average fiber diameter of 1.2 μm, the thickness of 0.2 mm, a bulk density of 0.2 g/cm^3. BY optimizing the filter thickness, one would at least expect to increase the frequency of the collision between the filter material and the leukocyte in the leukocyte-containing solution and decrease the filtration time, to filter the leukocyte removed liquid.

Response to Applicant's Arguments

15. Applicant argues that "it is not possible to make conclusions about the formation index of a filter by the mere knowledge of the average fiber diameter, thickness of the filter, and its basis weight…the formation index is an index which indicates the uniformity of the fiber material. The formation index was introduced based on the

findings that uniformity all over the whole filter material is a very important parameter to achieve a higher level of filter performance compared to conventional filters...Table 1 demonstrate that the formation index depends not only on one or two parameters, but is a much more complex interaction of different parameters." Applicant further argues that "the flowability indicated by the width of the arrows is greatly improved by a filter using a highly uniform nonwoven fabric in accord with the present invention."

16. Applicant's arguments have been fully considered but have not been found persuasive. The Tanaka reference teaches that "when this reticulate fiber structure is uniformly kept on the porous element at the cross-section perpendicular to the flow of the leukocyte-containing solution, the leukocyte can be captured with a good efficiency, so that it is preferred. That the fiber structure is uniformly kept on the porous element at the cross-section perpendicular to the flow of the leukocyte-containing solution means that when portions of filter material in the cross-section perpendicular to the flow of the leukocyte-containing solution are sampled at random, the amount (density) of the fiber structure contained in each of those sampled portions of filter material is substantially equal, and this amount introduced can be actually determined by measuring the scattering of amount of the fiber structure present in a given amount of the filter material (see column 4, lines 66-67 and column 5, lines 1-11). Further, Tanaka teaches that "a uniform reticulate structure is formed refers to such a state that the reticulate structure in each portion of the filter material sampled at random has, when observed through an electron microscope, a distribution of approximate mesh sizes and a similar mesh form and is deemed to be substantially the same" (see column 5, lines 22-27). Furthermore,

claim 25 recites, “A leukocyte removal filter...comprising: nonwoven fabric having an average fiber diameter of 0.3 to 3.0 μm and a formation index y of 50 or less corresponding to a thickness of 0.3 mm." The claim indicates that a thickness of 0.3 mm would lead to a formation index y of 50 or less. Furthermore, claim 27 recites, “…wherein y satisfies the following inequality: y < -4 x average fiber diameter of nonwoven fabric (μm) + 55.” This further indicates that formation index y is dependent on the average diameter of the nonwoven fabric. The MPEP 2144.05 states “A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559F.2d 618, 195 USPQ 6 (CCPA 1977). The instant specification indicates the formation index is important for uniformity. It would have been obvious to one of ordinary skill in the art to optimize the filter uniformity to remove leukocyte which have certain size. Filter for removal of leukocyte must be uniform to avoid any clogging. If pores are not uniform, this leads to clogging, thus optimization of formation index to obtain uniform filter is obvious and one of ordinary skill in the art would have been motivated to do so to avoid clogging the filter and to remove only the leukocytes. Since the formation index is a result-effective variable that is dependent on the thickness and the average diameter of the nonwoven fabric, the optimization of fabric diameter and thickness to optimize the “uniformity” of the filter is deemed merely a matter of judicious selection and routine optimization that is well within the purview of skilled artisan.

17. Claims 30-32 are rejected under 35 U.S.C. 102(b)/103(a) as being anticipated/ unpatentable over Tanaka et al (US Patent No. 6,048,464) as applied to claims 25-29, 33 and 38 above, in view of Lee et al (US Patent No. 5,935,436) and Nishimura T (US Patent No. 5,543,062).

18. The teachings of Tanaka et al are described, supra. The difference between the reference and the instant claims is that the reference does not teach that the leukocyte removal filter comprises a flat filter or a cylindrical filter having an inlet and outlet for liquid and the leukocyte removal filter container is formed of a flexible resin.

19. However, Lee et al teach filter devices for simultaneously removing leukocytes and viral inactivating agents from whole blood or blood fractions (see abstract). The reference further teaches that to reduce the effect of clogging and ensure filtration of a single-donor unit of plasma can be completed within a reasonable time requires that sufficient frontal area be available in the filter. The filter media may be shaped as layers of flat sheets, or as hollow fibers, or cylinders where the plasma flow would be directed through their annular walls (see column 5, lines 60-63 and 66-67 bridging column 6, lines 1-2). The reference further teaches that the filter device shown in Figure 1 consists of a cylindrical housing and a cover fitted with inlet and outlet tubing connectors (see FIG. 1 and column 9, lines 7-9).

20. Nishimura patent teaches a leukocyte removing filter device made of nonwoven fabric and a casing having an inlet for blood and an outlet for leukocyte-removed blood (see abstract). The reference teaches that any of the customary materials can be used for the casing as long as the materials do not have an adverse effect on blood. The

reference teaches that pliable polyvinyl chloride can be used for the casing (see column 11, lines 46-48 and lines 54-55).

21. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Tanaka et al, Lee et al and Nishimura, since the references teach the leukocyte removal filter. Additionally, Lee et al teach that the filter device can simultaneously remove leukocyte and viral inactivating agents. One of ordinary skill in the art would have been motivated to combine since Lee et al teach that to reduce the effect of clogging and ensure filtration within a reasonable time requires that sufficient frontal area be available in the filter. This influences the design of the filter devise in terms of packaging the necessary quantity of sorption media into the most favorable aspect ratio, i.e. the ratio of frontal surface area to volume. Additionally, Lee reference teaches that the filter media may be shaped as layers of flat sheets, or as hollow fibers or cylinders where the plasma flow would be directed through their annular walls (see column 5, lines 60-63 and 66-67 bridging column 6, lines 1-2, and FIGURE 1). Nishimura teaches that the use of a pliable material is advantageous in that the casing allows more fitted contact with the inner surface of a centrifuge cup by virtue of the pliable nature of the materials of the casing (see column 11, lines 60-63). There is a reasonable expectation of success, since the leukocyte removal filter would remove the leukocyte in relatively short period of time, and the casing (container) comprising a pliable resin would have less damage to the filter and the blood bags.

Response to Applicant's Arguments

22. Applicant argues that "for the reasons discussed above, the presently claimed invention is not obvious over TANAKA. Claims 30-32 specify certain features of the leukocyte removal filter, i.e., the shape of a flat or a cylindrical filter, and depend ultimately from claim 25…LEE and NISHIMURA do not cure the deficiencies of TANAKA."

23. Applicant's arguments have been fully considered but have not been found persuasive. The Tanaka reference teaches that "when this reticulate fiber structure is uniformly kept on the porous element at the cross-section perpendicular to the flow of the leukocyte-containing solution, the leukocyte can be captured with a good efficiency, so that it is preferred. That the fiber structure is uniformly kept on the porous element at the cross-section perpendicular to the flow of the leukocyte-containing solution means that when portions of filter material in the cross-section perpendicular to the flow of the leukocyte-containing solution are sampled at random, the amount (density) of the fiber structure contained in each of those sampled portions of filter material is substantially equal, and this amount introduced can be actually determined by measuring the scattering of amount of the fiber structure present in a given amount of the filter material (see column 4, lines 66-67 and column 5, lines 1-11). Further, Tanaka teaches that "a uniform reticulate structure is formed refers to such a state that the reticulate structure in each portion of the filter material sampled at random has, when observed through an electron microscope, a distribution of approximate mesh sizes and a similar mesh form and is deemed to be substantially the same" (see column 5, lines 22-27). Furthermore,

claim 25 recites, “A leukocyte removal filter...comprising: nonwoven fabric having an average fiber diameter of 0.3 to 3.0 μm and a formation index y of 50 or less corresponding to a thickness of 0.3 mm." The claim indicates that a thickness of 0.3 mm would lead to a formation index y of 50 or less. Furthermore, claim 27 recites, “…wherein y satisfies the following inequality: y < -4 x average fiber diameter of nonwoven fabric (μm) + 55.” This further indicates that formation index y is dependent on the average diameter of the nonwoven fabric. The MPEP 2144.05 states “A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559F.2d 618, 195 USPQ 6 (CCPA 1977). The instant specification indicates the formation index is important for uniformity. It would have been obvious to one of ordinary skill in the art to optimize the filter uniformity to remove leukocyte which have certain size. Filter for removal of leukocyte must be uniform to avoid any clogging. If pores are not uniform, this leads to clogging, thus optimization of formation index to obtain uniform filter is obvious and one of ordinary skill in the art would have been motivated to do so to avoid clogging the filter and to remove only the leukocytes. Since the formation index is a result-effective variable that is dependent on the thickness and the average diameter of the nonwoven fabric, the optimization of fabric diameter and thickness to optimize the “uniformity” of the filter is deemed merely a matter of judicious selection and routine optimization that is well within the purview of skilled artisan. Furthermore, Lee et al teach that the filter device can simultaneously remove leukocyte

and viral inactivating agents. One of ordinary skill in the art would have been motivated to combine since Lee et al teach that to reduce the effect of clogging and ensure filtration within a reasonable time requires that sufficient frontal area be available in the filter. Additionally, Lee reference teaches that the filter media may be shaped as layers of flat sheets, or as hollow fibers or cylinders where the plasma flow would be directed through their annular walls (see column 5, lines 60-63 and 66-67 bridging column 6, lines 1-2, and FIGURE 1). Nishimura teaches that the use of a pliable material is advantageous in that the casing allows more fitted contact with the inner surface of a centrifuge cup by virtue of the pliable nature of the materials of the casing (see column 11, lines 60-63). There is a reasonable expectation of success, since the leukocyte removal filter would remove the leukocyte in relatively short period of time, and the casing (container) comprising a pliable resin would have less damage to the filter and the blood bags. Therefore, the combined references are *prima facie* obvious over the instant claims.

Conclusion

24. No claim is allowed. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**.

See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to JULIE HA whose telephone number is (571)272-5982. The examiner can normally be reached on Mon-Thurs, 5:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cecilia Tsang can be reached on 571-272-0562. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. H./
Examiner, Art Unit 1654

/Cecilia Tsang/
Supervisory Patent Examiner, Art Unit 1654